National Institutes of Health

Fact Sheet — *Rheumatoid Arthritis*

Rheumatoid arthritis (RA) is an inflammatory disease affecting about 2.1 million people, and causes pain, swelling, stiffness, and loss of function in the joints. Several features make it different from other kinds of arthritis – such as generally occurring in a symmetrical pattern. This means that if one knee or hand is involved, the other one also is. The disease often affects the wrist joints and the finger joints closest to the hand, but it can also affect other parts of the body besides the joints. Rheumatoid arthritis occurs in all races and ethnic groups. Although the disease often begins in middle age and occurs with increased frequency in older people, children and young adults also develop it. Like some other forms of arthritis, rheumatoid arthritis occurs much more frequently in women than in men.

Thirty Years Ago

- Treatments for the pain, swelling, dysfunction and disability resulting from the inflammation and joint deformity of RA were limited to aspirin, colloidal gold and steroids.
- Although they relieved symptoms, steroids did not retard disease progression and had serious side effects including hypertension, diabetes, osteoporosis and cataracts. Similarly, aspirin and gold had limited effectiveness and significant side effects.
- Drugs such as methotrexate and cyclosporine were also used, but they were insufficient in some patients, ineffective in other patients, and had intolerable side effects.
- Patients with RA had a 10-20 year shortened lifespan due to infection, premature atherosclerosis, cancer and other causes.
- During this period, treatment evolved to include non-steroidal anti-inflammatory medicines that reduce swelling and pain, but do not influence the deforming progression of the disease.

Today

- Research in animal models of arthritis and on tissue from patients undergoing joint replacement, provided remarkable insight into the disease process. Additionally, better characterization of the inflammatory process identified several molecules to be targeted for novel drug development.
- Tumor necrosis factor alpha (TNF-α), a molecule involved in immune-system regulation, was found in high levels in the blood and joints of animals and people with arthritis. Researchers developed anti TNF-α antibodies, which block the disease in animals.
- Three agents, all of which block the action of TNF-α, were tested in clinical trials, granted FDA approval, and are on the market for treatment of RA. In addition, another agent that blocks the activation of the cells that release TNF-α also has been licensed by the FDA.
- As little as a single dose of these agents can seem to be a "miracle drug" to patients – eliminating symptoms, increasing energy and decreasing inflammation. Even more striking is the ability of these molecules to halt the progression of joint destruction and even repair bone and cartilage.

Tomorrow

The increasing insights into the disease process, better approaches to tailor treatments to each patient and availability of safer/more effective medicines will eliminate the suffering and mortality associated with RA in the coming years.

- *Predicting RA.* Genetic markers will allow the identification of patients at risk for developing RA and other autoimmune diseases.
- *Personalized treatments*. Pharmacogenomic and toxicogenomic approaches will identify the best and safest drugs to use for each individual. Biomarkers for disease risk, onset, activity, progression, damage and outcomes will allow careful ongoing monitoring to further optimize the personalized approach.
- *Preemptive approaches*. Recognition of the environmental and other triggers that initiate disease in susceptible individuals will lead to preemptive strategies.